





ART. XI.—*On the Diagnosis and Treatment of Thoracic Aneurism.*

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*Pulsating Tumours, with and without Bruit; Hemoptysis; Epistaxis; Variations in, and Suppression of, Respiration; Laryngeal Cough; Aphonia; Dysphagia; Contracted Pupil; Ptosis; Alterations in the Muscles of Expression; Heat of Ears; Pustular and Herpetic Eruptions, and Other Symptoms of Nervous Pressure.*

THE diagnosis of thoracic aneurism has long been a question of vital interest and importance to the physician. Of late many valuable additions have been made to the symptoms and physical

signs of this lesion, but none of more value than those dependent on pressure on the cervical sympathetic, on the nerves of the upper region of the spinal cord, and those traversing the thorax generally. This is specially evidenced by arrest of respiration, variations in the voice, difficulty of swallowing, and neuralgic seizures; whilst the objective effects seem to be specially exemplified in altered conditions of the eye and its appendages, in variations in the muscles of expression, by increased temperature, and, lastly, in pustular and herpetic eruptions on the skin. It is to illustrate these phenomena I adduce the following cases:—

CASE I.—John C., aged fifty-seven years, was admitted into Mercer's Hospital, on the 7th of November last. About three weeks before his admission he felt a pain in his right breast, which radiated over the sternum, towards the opposite side, and was aggravated by his lying in any position except the supine. It was intermittent in character, but, during its exacerbation, was very severe. He had been a hard drinker, and suffered from acute rheumatism about ten years ago.

In appearance the patient is healthy; and, on stripping the chest, his muscular development is above the average. He complains of pain between the shoulders and down both arms, of having occasional sensations of fainting, and pain about the precordial region. He has a slight cough; and, since his admission into hospital, he observed his expectoration to be mixed with blood of a dark red hue.

On examination, appreciable dulness can be elicited, on percussion, in the right subclavicular region, close to the sternum; and, on applying the hand over the part, distinct pulsation can be felt. The heart's sounds are normal; but about the junction of the cartilage of the third rib, on the right side, with the sternum, both sounds are louder and more marked than over the precordial region; and over this same space a systolic bruit can be heard, prolonged into both subclavian arteries, but especially into the right. Respiration is natural, and there is no perceptible difference between the radial pulses. He does not complain of dyspnoea.

Now, in this case we have many subjective symptoms, and physical signs of thoracic aneurism. Among the former I may mention the neuralgic pains, modified attacks of angina; whilst among the latter, dulness on percussion, distinct pulsation, with systolic bruit and hemoptysis, are the most prominent. Now, as to

what this latter sign is dependent on, in this case, is a question of primary importance. Dr. Gairdner<sup>a</sup> has told us that it is customary to ascribe minor hemorrhages, not to rupture of the sac, but to congestion of the lung from pressure on the veins, and consequent impediment to the return of blood; but he does not think this can be admitted as the chief cause of minor hemorrhages, as, in cases in which pressure on the veins may have occurred, hemorrhage, continuous or repeated at least, is almost always associated with either direct pressure of the sac upon the lung, or upon an ulcerated bronchus; and, again, because some of the most characteristic cases, he has observed, of slight and continuous hemorrhage, have been from aneurisms in which no pressure on the pulmonary veins was possible, but in which there was undoubted pressure upon, and opening of the sac into, the trachea. He believes that blood, in the discharges of a patient affected with aneurism, *generally* indicates the communication of the sac with a mucous membrane; and more especially is this the case in aneurisms accompanied by hemoptysis, if the pressure of the tumour be on the trachea, and if it be unaccompanied by the indications of pulmonary change.

Now, in the case I have just detailed, the hemoptysis was of a deep red character; and, as the most careful examination with the stethoscope failed to detect any inadequacy or difference of respiration in either lung, I am inclined to fall in with the views of Dr. Gairdner, and to attribute the hemorrhage to some communication between the diseased vessel and bronchial tube.

I shall next give the details of a case of aneurism of the thoracic aorta, in which, in addition to hemoptysis, there were other symptoms and physical signs of interest present:—

CASE II.—P. S., aged forty-seven, was admitted into Mercer's Hospital, on the 1st of May, 1863.

For the last few years he has been employed as a labourer, having formerly been a servant. About four years ago he was first seized with a hard dry cough, with thick expectoration, difficulty of breathing, and pain in the right side, which, at times, intermitted; and about this date he spat some black blood—which has since re-appeared at intervals. He complained of coldness of the extremities, and of pain down the right arm, if kept in a fixed position

<sup>a</sup> Clinical Medicine. 1862.



for any length of time, or after much use of it—the pain, at times, so severe about the articulation of the humerus that he was obliged to make pressure over it to give him relief. For the last year he has suffered from difficulty in swallowing—not absolute pain, but as if the food stopped half-way down the œsophagus. His voice is subdued, and slightly hoarse. About a month before admission into hospital he was seized with a fluttering sensation of the heart, accompanied with two or three convulsive sobs; which was followed by a shivering fit and sense of sickness; these attacks recurred about every second day.

On examination of the chest, and on making him take a deep inspiration, I found the expansion was not equable, the right scapula being more movable than the left. The left side of the chest is preternaturally resonant, and the stethoscope reveals an absence of respiration over this side, except under the scapula, where a faint respiratory murmuring is audible. Percussion over the right lung, anteriorly, is, perhaps, a shade duller than it should be; but respiration can be heard all over this side. His cough is dry and ringing. The heart's action is slightly irregular, and the pulse in the right wrist is much stronger than that in the left. The anterior and external jugular veins, as well as the veins ramifying over the top of the chest generally, are unduly prominent. The supra-clavicular hollows are preternaturally deep, and there is contraction of both pupils, especially the right, which responded very faintly to the application of belladonna.

This case was designated as one of thoracic aneurism, mainly from the pulmonary lesion, and the patient left Mercer's Hospital somewhat relieved, and, early in June, was admitted into the Richmond Hospital, where he died the day after admission. Dr. Banks was kind enough to show me the pathological conditions present, which consisted of an aneurism, slightly pyriform in shape, which engaged the posterior portion of the ascending angle and transverse portion of the aortic arch. The heart was fatty, but its valves intact. The left lung was diminished in capacity; but, from the brief period which elapsed from the patient's admission into hospital till his death took place, an opportunity was not afforded of observing the relative inadequacy of the respiration in either lung, and, consequently, their pathological condition was not as carefully observed as we could have wished, inasmuch as the respiratory physical signs in this case lent a far more important aid to the diagnosis of the disease than did those of the circulatory.

The hemoptysis in this case was described by the patient himself as being small in amount, and of a *blackish* colour; which, coupled with the absence of respiration over the left lung generally, would lead me to conclude that it was of a pulmonary character, the result of passive engorgement, from long-continued pressure on the left bronchus, gradually bringing about collapse of the cells, and atrophy; whereas in the first case, we had the hemoptysis of a *brighter colour*, and unaccompanied with any evidence of pulmonary inadequacy. And, consequently, as I have already stated, I believe it was due to direct aneurismal communication with the bronchus. The dysphagia was caused by either indirect pressure on the œsophagus, for the left bronchus was pressed upon, and this, in its turn, would entail pressure on the œsophagus and thoracic duct; or the dysphagia might be in great measure, if not wholly, due to pressure on the pneumo-gastric nerve. Again, the aphonia can be readily accounted for, by pressure on the recurrent laryngeal nerve, which would thus paralyze the arytenoid muscles and those of the larynx generally.

As regards the contraction of the pupil, this phenomenon was so markedly exemplified in the following case, that I will reserve its special consideration till the following details are before us, some of which I have already alluded to in a clinical lecture on thoracic aneurism,<sup>a</sup> whilst the case was under observation in an early stage. The case was one in which difficulty of breathing, ringing, laryngeal, spasmodic cough, loss of uniform configuration of the thorax, by falling in of left side, hemoptysis, dysphagia, neuralgic pains, contracted pupils, more especially the right; persistent pustular and herpetic eruptions over the top of the chest, and between the scapulæ, were well exemplified.

CASE III.—M. L., was admitted into Mercer's Hospital, in the month of October, 1862; a shoemaker by trade, he had been subjected to hard work and close confinement. He complained of distress of breathing, at times almost amounting to suffocation; of difficulty of swallowing, and severe pains radiating over the shoulders and down the back. He had a hard, ringing, laryngeal cough, with stridor, and the imperfection of voice well nigh amounted to aphonia. There was manifest contraction of both pupils, more especially of the right, which scarcely exceeded a pin head in size,

<sup>a</sup> The Medical Press of 28th January, 1863

On stripping the patient, percussion gave dulness over the top of the sternum, and particularly over the scapular spines, whilst the stethoscope revealed a second centre of pulsation over the top of the sternum, louder than that heard over the precordial region, but unaccompanied with bruit; the respiration of the left lung was certainly more feeble than that of the right. The veins over the top of the sternum were more visible than normal, and a fullness about the junction of the first rib with the sternum, on the left side was appreciable; the left radial pulse could scarcely be felt. Things continued without much variation till the 1st May, 1863, when, on stripping the patient, the falling in of the left side of the thorax, generally, became remarkable, more especially posteriorly, under the point of the left scapula. This falling in of the side differed from that usually observed after the removal of pleural fluid; it was not so oblique laterally, more a falling in of the side generally, from the spinal column round to the sternal articulation. Percussion in this case yielded rather a clear sound. There was deficient respiration (well nigh amounting to absence) over this side generally, and its measurement was an inch and a-quarter less than that of the right. The patient has latterly had hemoptysis, of rusty red colour, but not so dark or prune-juice as the sputa of pneumonia. As regards the other physical signs they presented little variation. He has suffered from repeated attacks of angina, and his respiration, at times, is distressing in the extreme; in addition, he has latterly been harassed with boils and herpetic eruptions, over the upper part of the chest and between the scapulæ. In the month of July this case terminated fatally by laryngeal suffocation; but, I regret to add, we were debarred from satisfying ourselves as to the extent of the lesion. But if I might be allowed to offer an opinion as to the situation of the aneurism, I should say it involved the transverse and descending angle of the arch.

Now I think this case comprised an unusual number of interesting phases, among which I may mention more especially the *pulmonary lesion*, evidenced by hemoptysis, absence of respiration, and general falling in of the side; the *contracted state of the pupils*; and lastly, the *persistence of pustular and herpetic eruptions* over the top of the chest and scapulæ.

The hemoptysis was, I think, manifestly due to pulmonary engorgement, the result of pressure on the left bronchus, which had given rise to gradual collapse and atrophy of the lung, and hence the symmetrical loss of the side. As to the contraction of the



pupil, which was so well marked in this case, the influence of pressure on the cervical sympathetic, and its effects on the eye and its appendages, is daily becoming more appreciated, and better understood. P. du Petit, about the year 1712, was one of the first, if not the first, to recognize this phenomenon, since which date many experimenters have appeared in the field. Dufuy and Breschet, like Petit, remarked that contraction of the pupil, convergent strabismus, ptosis and conjunctivitis followed division of the sympathetic.<sup>a</sup> Budge and Waller, in 1841, proved by experiments that the sympathetic branches which influence the iris, do not originate from the cervical ganglia, but that they take their origin from the spinal cord, passing through the spinal nerves to the sympathetic cervical ganglia. By tracing these nerves they found a region where irritation produced no results; and by removing portions of the cervical cord, bit by bit, and observing its influence on the pupils, they went on to prove, that in some animals, the branches which control the movements of the iris, were intimately related with that part of the spinal marrow itself as a centre, which extends from the sixth cervical to the fourth dorsal vertebra, and that in this space any galvanic stimulus applied, if not in excess, produced dilated pupil. To this portion of the cord they gave the name of the cilio-spinal region. Again, Valentin's experiments led him to conclude that the pupil is supplied from a double nervous source, the dilating fibres of the iris being furnished from the spinal system through the sympathetic, whilst the circular fibres are controlled by the third cranial nerve; hence section or pressure on the sympathetic paralyzes the dilating fibres, leaving the pupil at the mercy of the third nerve, and hence contraction.

Dr. Reid found pressure on the cervical sympathetic give rise to contracted pupil, which disappeared *pari passu* with the removal of the pressure.

Of late many observers have contributed cases, bearing out the realization of these interesting nervous phenomena, in connexion with the diagnosis of thoracic aneurism, and intra-thoracic tumours, among whom I may mention, Dr. M'Donnell of Montreal, Dr. Banks of this city, Drs. Seaton, Reid, Gairdner, Walsh, and others; but by far the most instructive paper on this subject, in a clinical point of view, which I have had an opportunity of seeing, is that

<sup>a</sup> Vierordt's Archiv. für Physiol. Heilkunde, 1852.

of Dr. Ogle,<sup>a</sup> of St. George's Hospital, "On the Influence of the Cervical Portions of the Sympathetic Nerve and Spinal Cord upon the Eye and its Appendages;" a paper at once replete with intense interest and instruction. Applying these nervous phases to the cases I have above detailed, we can reasonably conclude that the contraction of the pupil in both instances was due to pressure on the cervical sympathetic. In the second case, from the situation of the aneurism, both inferior cervical ganglia must have been pressed upon, as indeed it is probable the same existed in the third case; but in both the right inferior cervical ganglia seem to have suffered most, if we are to judge by the more decided contraction of the right pupils.

I have mentioned the fact of boils and herpetic eruptions having prevailed in the third case, more particularly as the disease advanced; and I think this condition is deserving of more attention, in a diagnostic point of view, than at first sight we would be disposed to give it; inasmuch as this is the second instance in which I have seen persistent herpetic rashes present where intra-thoracic tumours existed. One of these cases is still under my observation.

CASE IV.—A shoemaker, aged 44; he suffered from neuralgic pains over the top of the chest and sternum, and from a troublesome ringing cough; and also from dysphagia, which has disappeared. He complained of tightness of the skin of the left half of the face; of tingling sensations over the same half, and of intense heat of both ears, at times. There was ptosis of the left eyelid, and drooping of the left angle of the mouth. The left pupil was more contracted than the right, and a herpetic patch covered the left half of the lower lip and chin, and other patches were present over the top of the chest and shoulders. The superficial veins over the upper part of the chest were remarkable; and a prominent tumour extended from the right clavicular articulation across the sternum, for more than an inch under the left clavicle, over which tumour a second centre of pulsation could be felt. The left radial pulse was indistinct, and the respiration was especially feeble over the left lung. In the month of May last he first had an attack of epistaxis, which gave him relief; and in October and November it returned again. At the end of this month the semi-ptosis of the left lid, deformity of the angle of the mouth, herpetic eruption, ringing

<sup>a</sup> Published in the forty-first volume of the *Medico-Chirurgical Transactions*.

tracheal cough, partial aphonia, and visible tumour still were present, and the epistaxis had returned; but the contraction of the pupil, the tightness of the muscles of half the face, and the heat of the ears had disappeared, at least to a great extent.

On the 19th January last I examined this patient, when the following changes had taken place:—There was no perceptible difference in the size of either pupil; the tightness of the muscles of the left half of the face had almost disappeared, as had also the heat of the ears; faint effort at ptosis of the upper lid was still present, and the angle of the mouth drooped a little. The herpetic eruption had disappeared from the chin and top of the chest—the first time the patient states for the last ten years;<sup>a</sup> the tumour was not so prominent. The greatest prominence still existed over the junction of the first and second rib, with the sternum on the right side; but the pulsation over the tumour was still very decided. The radial pulses were nearly equable; nor was the cough so distressing; the dysphagia had not returned.

Now these are features of no ordinary interest; but these remissions have not occurred for the first time in this case, as the patient tells me that in the Autumn of 1861, while in Sir Patrick Dun's Hospital, under Dr. H. Kennedy's care, he suffered from difficulty of swallowing and respiration, and that these distressing symptoms were then relieved by the appearance of a large tumour, soft and pulsating, which suddenly appeared at the top of the chest, to the left side. At this time he lost his voice, which was restored to him gradually as the external tumour lessened, which it did after the course of a month; the greatest prominence remaining on the right side.

Now in this case we have contracted pupil which could be accounted for as in Lalor's case; but, in addition, we meet with tension of the muscles of one half of the face, deformity of the angle of the mouth, and occasionally heat of the ears. Brown-Sequard, Bernard, and others, have shown the influence of the "sympathetic" on the modification of sensibility and vascularity, and of the temperature of the external parts supplied by it. And Bernard, in addition, ascertained that division of the cervical sympathetic induced an increased temperature within the cerebral hemisphere on the side in which section of the nerve was made, and that the blood in the jugular vein of the same side was rendered warmer. In

<sup>a</sup> However, it has again appeared.



addition to modifications of temperature and vascularity, altered condition of muscular parts may result from interference with the same, as we see exemplified in the case before us by tightness of the muscles of one half of the face, and deformity of the angle of the mouth.

Dr. M<sup>c</sup>Veagh, of this city, has been kind enough to furnish me with the notes of a case of thoracic aneurism, which was under Mr. Hutton's care in the Richmond Hospital; it engaged the transverse portion of the arch of the aorta, and till it terminated fatally the patient was afflicted with cutaneous irritation and furuncles over various parts of the body. MM. Dupuy and Breschet, in experiments made upon the cervical sympathetic in the horse, observed a dryness and adherence of the skin, increased temperature of the ears, with augmented perspiration and eruption upon the skin.

Dr. von Barenprung in a paper<sup>a</sup> "On Herpes, especially with Reference to its Connexion with Affections of the Nervous System," when considering the topography of the disease, and bearing in mind its dependence upon derangements of internal organs, shows that the eruption follows the course of various nerves.

He considers the etiology of the disease at considerable length, and determines that in the skin, inflammation possessing as it does a typical form, and limited to a peripheric distribution of certain cerebral and special nerves or their branches, the source of the inflammation is not external, nor in the blood, but that it operates through the nerves; and, in fact, depends upon their abnormal irritation. He thinks it cannot have a central origin, for the herpes is usually confined to one side of the body, following the track of one or two nerves; nor can it spring from a cerebral source, for then it would be frequently extended to the whole of one half of the body; nor from the spinal marrow, for then it would be, as a rule, symmetrical; he locates the point of irritation in the posterior root of the spinal nerves; inasmuch as the affection is so frequently associated with exalted sensibility. Hence it is to the posterior roots of the spinal nerves and to the spinal ganglia which are connected with these roots, that we must look for an explanation of this phenomenon.

Dr. von Barenprung quotes cases to show that a peripheric irritation of a nerve containing ganglion fibres may cause a limited

<sup>a</sup> *Annalen des Charité-Kranken hausen zur Berlin*, Bd. ix., 1861, and in the *Medico-Chirurg.* Review of Jan., 1862.

eruption of herpetic vesicles; and to this latter class the herpes in the case under consideration would seem to be more especially referable, inasmuch as an aneurism or other tumour, pressing on the periphery of any of the spinal nerves, connected as they are known to be with the sympathetic in the thorax, would be capable of setting up such a cutaneous irritation as I have described in these two cases; but this explanation, for the present, I must promulgate with reservation, and content myself with alluding to the presence of the eruption, for the sake of its diagnostic value, which, taken in conjunction with other negative and obscure physical signs and symptoms, might be the means, in some cases, of lending collateral aid in the diagnosis of this too frequently latent affection.

But I think, in the present instance, the fact of the intermissions in the separate symptoms which have occurred, now for the second time, is most interesting. On the first occasion, the disappearance of the dysphagia and distressing dyspnea is endorsed by the patient's own statement; but it is not possible to say how the nervous symptoms, which afterwards were so marked, behaved, or whether at that date they were present at all. Certain it is that now they are mitigated, to say the least of them; and many of them may be said to have vanished. These disappearances of important phases and well marked collateral symptoms, and their being replaced by others, might naturally mislead an observer, and tend to make him sceptical in his diagnosis; but these variations are traceable to some alteration in the size and situation of the tumour; and in this case they are evidently due to change in its direction; this is more especially exemplified in the general change in the appearance of the face, which has comparatively lost its lividity; which, from time to time, I have no doubt, was relieved by the recurring attacks of epistaxis; these have not returned for some time, owing, no doubt, to the relief from pressure on the superior cava or some other tributary venous trunk.

A prominent tumour existed in the fourth case; the most marked bulging at the right edge of the sternum, corresponding to the first division of the arch; this tumour is pulsatile and synchronous with the systole of the heart. Single systolic pulsation was also present in the first and third cases; but no tumour was visible. Only in one (the first) of the four cases detailed, was murmur to be heard, and that was single and systolic. These bruits seem to me to vary as regards their rhythm—the different periods of the disease and the regions they are heard over; thus, not long ago,



I saw a case of subclavian aneurism in its third stage, which tilted up the head of the listener, and over which tumour a loud whirling systolic bruit was audible; tracing this bruit towards the innominate, its intensity was much diminished, and about the bifurcation it assumed a double or continuous character. It is not my intention to enter on the subject of the mechanism of aneurismal murmurs, on the present occasion, but this much I may say, that their presence and intensity must depend on a variety of essential conditions. Thus, to have such physical signs, it is necessary that the sac should be capable of expansion; that it should be well nigh empty; that its communication with the vessel should neither be too wide or too narrow; that the heart's action should be strong. Such a combination of circumstances being essential for the production of murmurs, it is not surprising, that single and double bruits are so seldom associated with thoracic aneurism, far less frequently than is generally supposed, at least as far as my experience goes.

As regards the treatment of thoracic aneurism, it is generally exhibited, more with the view of relieving the collateral affections—as bronchitis, angina, laryngeal suffocation, &c.—than with the view of bringing about amelioration of the primary disease. General bleeding, as recommended by Valsalva, may now be said to be exploded, as it is wholly unsupported by theory; but occasional leeching over the tumour may be advisable. Purgatives and diuretics are useful, inasmuch as they prevent an excess of the watery constituents of the circulating fluid; whilst sedatives—as digitalis, acetate of lead, hydrocyanic acid, belladonna—by lessening the heart's action, tend to coagulation. With the same intention iodide of potassium has been recently recommended by Dr. Roberts, of Manchester, and I have given it a trial in two cases—in one of which (the fourth) the tumour has decidedly lessened; but whether it is due to the physiological action of the iodide or mechanical shifting of the sac, I cannot positively say. Cold applications, as ice or iced poultices, often afford relief and permit coagulation; but they must be cautiously applied, as their refrigerent action, too long continued, becomes injurious. Where the neuralgic pains have been very severe, chloroform I have found the most useful local application, either pure or combined with camphor liniment; and, where the laryngeal stridor and dyspnea have been intense, as in the third case, blisters, applied over the cilio-spinal region, have afforded relief. This treatment I find recommended by Dr. Stokes, in his book on *Diseases of the Heart and Great Vessels*, where he

mentions a case in which issues over the spine, where erosion of the vertebræ was accompanied with tenderness on pressure, freed the patient from pain, cough, and dysphagia, so long as they discharged freely. On two occasions the dryness of the issues was followed by great suffering, which was again removed by their re-establishment. In extreme cases of laryngeal distress tracheotomy has been advocated, but, for so far, with no very encouraging results.

The diet of a patient affected with thoracic aneurism should be liberal, not stimulating; but this golden rule cannot be strictly carried out, should angina or the symptoms of a weak heart manifest themselves.





